

CLAIMS

1. A flame retardant composition comprising:
 - (a) 81 to 99.99 weight percent of a thermoplastic resin, thermoset resin, thermoplastic resin blend, or thermoset resin blend which upon burning forms a char; and
 - 5 (b) 0.01-19 weight percent of a silsesquioxane resin having a weight average molecular weight of greater than 300 and having the average molecular formula:
$$(R_3SiO_{1/2})_a(R_2SiO_{2/2})_b(RSiO_{3/2})_c(SiO_{4/2})_d(RO_{1/2})_e(OH_{1/2})_f$$
wherein each R is hydrogen, an alkyl group, an alkenyl group, or an aryl group having from 6 to 12 carbon atoms, a and b are zero or positive numbers and the value of a+b is greater than zero, c is a positive number, d, e and f are zero or positive numbers with the provisos that the copolymer comprises at least 40 mole percent of $RSiO_{3/2}$ units, the copolymer comprises less than 10 mole percent $SiO_{4/2}$ units, greater than 30 mole percent of the silicon-bonded R groups are silicon-bonded aryl groups, greater than 0.5 mole percent of the silicon-bonded R groups are silicon-bonded hydrogen atoms, the content of silicon-bonded hydroxyl groups is 10 equal to or less than 2 weight percent, and the content of silicon-bonded alkoxy groups where the alkoxy group is methoxy or ethoxy is equal to or less than 5 weight percent.
- 15 2. A composition according to Claim 1, wherein (a) is selected from polycarbonates, polyamides, polyesters, blends of polycarbonates with other polymers, polyphenylene ether, polyphenyleneoxide, blends of polyphenylene ether with styrenics, blends of polyphenyleneoxide with styrenic materials, polyaramids, polyimides, phenyl-containing resins having a rigid rod structure, styrenic materials, polyacrylates, styrene-acrylonitrile resins, halogenated plastics, polyketones, polymethylmethacrylate (PMMA), thermoplastic elastomers, cellulosics, rayon, or polylactic acid.
- 25 3. A composition according to Claim 2, wherein the styrenic materials are selected from acrylonitrile-butadiene-styrene, polystyrene, or high-impact polystyrene.

3. A composition according to Claim 1, wherein (a) is selected from polycarbonates, polycaprolactam, polylauryllactam, polyhexamethyleneadipamide, polyhexamethylenedodecanamide, blends of Nylons with other polymers, polybutylene 5 terephthalate, polyethylene terephthalate, polyethylene naphthalate, polycarbonate-acrylonitrile-butadiene-styrene blends, polycarbonate-polybutylene terephthalate blends, polyphenylene ether, polyphenyleneoxide, polyphenylene sulfide, polyether sulphone, polyethylene sulfide, acrylonitrile-butadiene-styrene, polystyrene, high-impact polystyrene, styrene-acrylonitrile resins, polyvinyl chloride, fluoroplastics, polymethylmethacrylate, 10 thermoplastic urethanes, thermoplastic vulcanizates, or styrene ethylene butylene styrene copolymer.

5. A composition according to Claim 1, wherein (a) is selected from epoxy resins, phenolic resins, urethane elastomers, or blends thereof.

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6. A composition, according to Claim 1, wherein each R is a hydrogen atom, methyl, or phenyl.

7. A composition according to Claims 1, 2, or 4, wherein the copolymer comprises 60 20 to 90 mole percent of $\text{RSiO}_{3/2}$ units, less than 5 mole percent of $\text{SiO}_{4/2}$ units, 50 to 80 mole percent silicon-bonded phenyl groups, 1 to 5 mole percent silicon-bonded hydrogen atoms, 0.5 to 1.2 weight percent silicon-bonded hydroxyl groups, and less than 5 percent silicon-bonded alkoxy groups where the alkoxy group is methoxy or ethoxy.

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8. A composition according to Claims 1, 2, 3, 4, or 5, wherein (b) is
 $(\text{Me}_2\text{HSiO}_{1/2})_a(\text{PhMeSiO}_{2/2})_b(\text{Me}_2\text{SiO}_{2/2})_b(\text{PhSiO}_{3/2})_c$,
 $(\text{MeHSiO}_{2/2})_b(\text{PhSiO}_{3/2})_c$, or
 $(\text{Me}_3\text{SiO}_{1/2})_a(\text{MeHSiO}_{2/2})_b(\text{PhSiO}_{3/2})_c$.

9. A composition according to Claims 1, 2, 4, or 5, wherein the compositions further comprise a sodium-containing catalyst.

10. A composition according to Claims 1, 2, 4, 5, or 9, wherein the compositions
5 further comprise polytetrafluoroethylene powder.